

LETTERS TO THE EDITOR

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[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

American Exploration

North-western Wyoming and Yellowstone Park

THE letter from Capt. W. A. Jones in NATURE, vol. xviii. p. 667, seems to show a feeling of irritation on his part at the notice of his Report upon a reconnaissance in North-western Wyoming, which appeared in your columns some months ago. There was not in that notice any expression which could be interpreted into a want of recognition of the ability with which he had conducted the operations committed to his charge. Of course the desirability of these operations, and whether they were important enough to justify the expedition, are matters of opinion regarding which we may differ from Capt. Jones, without for a moment casting any reflection upon him. One object of the remarks which have displeased him was to point out the need of some central authority to control the various exploratory surveys in the United States, and prevent a needless expenditure of labour and money in the reduplication of work by parties operating without any concert with each other. This subject was brought before the notice of Congress, and a special committee was appointed to consider it and take evidence. The report of the sittings of this committee shows a most laudable desire of patiently getting at the truth. It recommends that the Engineer Department should not be authorised to undertake any surveys except such as might be required for purely military purposes. Of course, Capt. Jones, as an officer of engineers, thinks this a very "one-sided report." But the decision of the committee met with the approval of the great body of scientific men in America, whose only desire could be the best means of facilitating the thorough exploration of their great country. And the decision was equally welcomed on this side of the Atlantic by men who knew nothing and cared less for the personal bickerings of the different Government departments and surveyors in the United States. Capt. Jones speaks of a quotation made from the committee's report as being "out of the pale of decent characterisation." It was nevertheless the deliberate statement of men who gave their testimony upon oath. Strong expressions of this kind are apt to raise more than a doubt as to the strength of the cause in support of which they are adduced.

With every wish to do full justice to Capt. Jones and his associates, I feel that there is a far larger question behind his complaint than the mere recognition of their contributions to our knowledge of the North American Continent. To students of science in Europe it is a matter of small moment under what Government department or by what organisation of surveying parties the work of exploration is carried on. Most cheerfully do we recognise the labour, the patience, the courage, the physical endurance, the sagacity of observation, and the admirable powers of generalisation which during the last fifteen or twenty years have been bestowed by the various departments upon the task of unravelling the geography and the geological history of vast tracts of the United States. Thus the Department of Engineers has earned our lasting gratitude for the thoroughness and accuracy of its contributions; and had it no other record of its work than the magnificent series of quartos relative to the survey of the 40th parallel, that department would have raised an enduring monument of its scientific prowess. But besides the exhaustive reports of Clarence King and his associates, the Bureau of Engineers has issued many other most admirable volumes, not least among which is that of Capt. Jones himself. Then the Department of the Interior has for a number of years enjoyed the lustre shed upon it by the researches conducted by Dr. F. V. Hayden. Capt. Jones speaks of this distinguished explorer in the generous spirit of a true lover of science. To have succeeded as Dr. Hayden has done means not merely that he has conquered the physical difficulties of unexplored regions, that he has possessed mental powers capable of grappling with the many difficult problems presented by these western territories, that he has that

judgment and *bonhomie* which have enabled him to select and keep round him year after year such a band of skilled observers as has included the names of Marvin, Peale, Endlich, and Gardner; but—what, perhaps, demands greater skill and patience than all the rest—that he has had the self-denial and courage to canvass the Congress, and literally persuade or coax its members into granting the necessary appropriations. It is all very well to talk of the dignity of science; but science cannot get on without money; and to get money she must, in America at least, "hide her dignity in her necessity, be fain to shuffle, to hedge and to lurch." That a man of Dr. Hayden's powers should require to go through this annual penance is sad to think, but, as matters stand, he must either go through it or give up his explorations. He has chosen the former alternative. That in so doing he has done wisely must be granted not only as regards the prosecution of his own operations, but indirectly in reference to the other explorations sanctioned and paid for by Congress. The altogether admirable surveys conducted by Major Powell, for example, also under the Department of the Interior, have a powerful backing in the prestige of Dr. Hayden's work. The Coast Survey has long been a model of accurate and exhaustive methods of research.

Capt. Jones remarks that "in the cause of science a little duplication and reduplication are things not to be sneered at." A few lines further on he says that "exploring is but imperfect work, so far as the survey, which is its foundation feature, is concerned;" and that "observations for longitude with any known portable instruments are painfully erratic, unless there be abundant time." No one ever "sneered at" the repetition of surveys by different exploring parties; but every one, unless perhaps a candidate for future employment in these expeditions, must admit that it is a pity to reduplicate work which is so confessedly "imperfect" and "painfully erratic." Let the first preliminary surveys be made, but let them be done systematically, so that different surveying parties shall work in concert, and not blindly re-survey each other's ground. If any subsequent reduplication can be undertaken let it be again done methodically, with the view of correcting and filling up the first rough outlines. This requires some central controlling authority, and it is the absence of this authority which has led to the misunderstandings and dispeace. At present any man who can gain the ear of Congress, and get an appropriation of so many thousand dollars may go and explore as he pleases, and very much where he pleases, provided only he renders account to the Department of the Interior for the disbursement of the money. Of course this want of supervision leaves the explorer untrammelled by the official bonds which would hamper him if he were surveying in a longer-settled country. He is entirely his own master, can arrange his work and dispose his staff precisely as he judges best for the sake of progress and efficiency. No doubt these are enormous advantages. But then, on the other hand, he must stoop to button-hole the Congress-men, and spend many valuable weeks in getting them to see that they ought to continue, or even to increase their grants to him. He has no departmental organisation behind him on whose support he can rely, and the mere passive existence of which would often of itself be enough for his purpose. He must every year fight his own battle over again against competing organisations, rival explorers, and utterly indifferent members of Congress. It was in this respect that the Department of Engineers proved so formidable an antagonist in the conflict which led to the appointment of the Congressional Committee referred to by Capt. Jones. It is an organised department of long standing with traditions and military *esprit de corps*. The several explorers under its wing had not to stand each with his back to the wall fighting for his own. Their cause was taken up as a general one by the engineers and the army, and it was only after much evidence had been led that the Committee agreed upon that "one-sided" Report which the engineers naturally resent.

If all the surveying work undertaken, or at least paid for, by Congress, were placed under some central control, enough would probably be done were precautions taken to secure that the various operations were carried on in concert and not in utter ignorance of each other, and that the maps and memoirs were issued in some one general form which would facilitate reference. The various explorers need not lose their practical independence. They might remain as unhampered as ever, and be left free to make their own dispositions within certain general limits. Such a central board ought to charge itself with securing the necessary money grants from Congress, and thus save its scientific men from the degradation and loss of valuable time in per-

sonally canvassing the members. The gain to the explorers in this way would surely far more than compensate for any fancied loss of independence.

One word more about American exploration, and it shall be one of unqualified admiration. When a member of any of the branches of the public service in this country which are concerned with scientific publications contemplates the style in which such publications are prepared and issued in the United States, he finds a spirit of envy rising uppermost within him. Quarto after quarto, atlas after atlas, all published in the most sumptuous style as regards paper, printing, engraving, and chromo-lithography, are poured out from the American national press, yet at such prices as not to place them beyond the reach of all but the rich. The number of copies of these costly works actually distributed gratuitously is almost incredible. They are scattered lavishly over Europe, not merely to public libraries, but even to private students of science whose names are known to few of their own countrymen save those who read their writings in the scientific journals. Such open-handed generosity makes many a recipient of the gifts accept them almost with reluctance when he knows how little we in this country can offer in exchange. It is not that we are idle, or that the results of our labours would not furnish materials for important memoirs. But they manage these things better in the States. Perhaps we may profit by their example some day.

ARCH. GEIKIE

Discovery of a Scottish Crannog

WILL you kindly allow me, through the columns of NATURE, to draw the attention of archaeologists to a recent discovery of an ancient crannog on the farm of Lochlee, near Tarbolton, Ayrshire. It appears that formerly a considerable portion of what is now arable land, and divided into several fields, was occupied by a loch with mossy banks and bottom, and that about forty years ago its outlet was deepened and its whole area completely drained. When this was done a small mound was observed near the outlet of the lake and about 100 yards from its nearest bank, which, from its artificial appearance and the discovery of two canoes in the bed of the lake, then attracted the curiosity of a few observant people in the neighbourhood, but led to no further result, and soon the whole affair was entirely forgotten. Just now the same locality is being re-drained under the direction of Mr. Turner, factor for the Duke of Portland, and his men, while engaged in cutting the main drain which happened to pass through a small bit of this mound, came upon the peculiar structure of the crannog. Fortunately this came under the cognizance of Mr. James Brown, Tarbolton, who wrote a note to Mr. J. Anderson, Keeper of the Museum of the Society of Antiquaries of Scotland, drawing his attention to this discovery. This gentleman immediately wrote to R. W. Cochran Patrick, Esq., of Woodside, Secretary of the Archaeological Society for the counties of Ayr and Wigton, who lost no time in visiting the district, and at once recognised the nature and importance of the discovery. Meantime Mr. Turner and myself made several visits to the locality, in the course of which we observed that three rows of closely-set wooden piles, six feet apart, extended from the mound to the mainland—presumably forming the foundation for a wooden gangway. The tops of these piles, except in a very few instances, are below the surface of the soil. At the same time the men dug up a canoe, in a good state of preservation, hollowed out of one log, and tapering rapidly and uniformly at both ends. It was lying about 150 yards from the mound, and the highest portion of it was three feet below the surface. It measures ten feet long, two feet six inches broad, and one foot nine inches deep. It was then arranged that a careful exploration of the mound should be made, and accordingly systematic excavations were begun on Tuesday last, in presence of Messrs. Turner, Patrick, Anderson, Dr. McDonald, Ayr, and myself, and are now being prosecuted with great vigour and success. As a detailed account of whatever discoveries may be made, together with plans, sections, and drawings of the crannog, will be published in the Collections of the Archaeological Society of this county, under the superintendence of its accomplished secretary, Mr. R. W. Cochran Patrick, it is unnecessary for me to give here more than a few remarks, just sufficient to convey to your readers some idea of what has already been done and may yet be expected. Guided by the tops of a few upright piles which just appeared on the surface, a broad trench was dug right round the mound. Some of these piles, all of which

were formed of young oak trees, were found to terminate in holes in large horizontal beams, while others appeared to be driven into the muddy bottom and surrounded by thick planks of oak, young trees, and brushwood, amongst which beech, birch, and hazel were readily recognised. On the north-east side, and only about one foot below the surface, were two series of horizontal beams of oak from five to six feet long, and about five feet apart, each of which had two square-cut holes near its extremities, through which upright piles penetrated and were firmly fixed by wedges of wood. These mortised beams rested on round trees which lay horizontally but pointed in various directions. Conterminous with these beams and running towards the centre, there was a rude and very much decayed platform formed of rough planks and saplings lying on large beams of split oak trees. The oozing of water prevented the complete exposure of the mossy bottom on which this curious structure was reared; but it was ascertained to be from seven to eight feet below the present surface. In all the parts that were examined large stones were found interspersed with the woodwork, and the diameter of the foundations of the mound was estimated at about twenty-five yards. A trench was then dug across this circular area, and near the centre we exposed two stony pavements, one lying immediately above the other, the space between being 2½ feet thick. These pavements rested on a thick stratum of clay which extended for several feet all round, gradually thinning towards the rim, and, from the abundant remains of ashes, charcoal, and burnt bones, evidently formed fire-places. About two feet below the lower pavement another layer of clay, together with ashes, charcoal, &c., was observed, and though not yet excavated, we concluded that it must have been a third fire-place. Nearly on a level with this was a layer of chips of wood as if cut by an axe, and underneath this was a layer of turf with the heather part downwards. On pressing the spade still further down it struck a log of wood. The perpendicular height from this log to the top of the upper pavement was seven feet nine inches. All these fire-places were below the level of the water before the first drainage was made. As it is ascertained that previously there was no island to be seen, the whole island must have sunk very much since its original structure. Round these fireplaces were the remains of a series of seven or eight large piles with their bases cut flat and resting on the floor of the middle pavement or a few inches below it. These upright piles inclosed a somewhat circular area, with a diameter varying from ten to fifteen feet. The articles hitherto discovered in the interior of the mound consist of querns, hammer-stones, bone-chisels, and lance-like objects, a spindle-wheel, wooden implements like clubs or paddles, &c., deer-horns, some cut across and marked with holes and other markings, numerous boars' tusks, and a great assortment of bones and teeth belonging to various kinds of animals. With the exception of a singular three-pronged iron instrument found in the large drain outside the mound and a rusty piece of iron shaped like a door-handle, picked up very near the surface of the mound, not the slightest trace of either iron or bronze has been discovered. A piece of red pottery, said by a competent authority to be so-called Samian, found in the same drain and near the same spot as the iron implement above alluded to, and the half of a grooved bead of the size of a hazel-nut and covered with a greenish pigment, are the only fragments of pottery as yet brought to light.

Kilmarnock, October 21

ROBERT MUNRO

Power of Stupefying Spiders Possessed by Wasps

MR. ARMIT's letter, from Queensland, on this subject (NATURE, vol. xviii. p. 642) is, to my mind, of great interest as showing that the habits of insects are the same at the antipodes as on our side of the globe. I was well aware that the spiders were stupefied (or paralysed) and not killed, and that the use made of them by the wasp was as a nidus for her ovum, and to serve as fresh provisions for her larvæ when hatched. Of course if killed they would be useless for this purpose. We have a wasp of similar habits, but he makes use, in the cases in which I have watched his operations, of the larvæ of the garden white butterfly, which are rendered passive and helpless, but not killed, in a similar manner.

I make alternative suggestions for further, and if possible microscopic, examination into the matter. First, are the wounds producing this insensibility inflicted with the sting, or by an ovipositor in the act of inserting the ovum? Is the egg in the case of the wasp, as with the ichneumon, inserted in the insect to serve by and by as food, or outside it, in the cell? If